CALIFORNIA ENERGY COMMISSION
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STATE OF CALIFORNIA – THE RESOURCES AGENCY GRAY DAVIS, Governor

STATE OF CALIFORNIA
ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION

NOTICE OF STAFF WORKSHOP
2005 BUILDING ENERGY EFFICIENCY STANDARDS
PROJECT SCOPE, SCHEDULE AND PLANS

The staff of the California Energy Commission will conduct a workshop to obtain public comment on development of the next update to the Building Energy Efficiency Standards for Residential and Nonresidential Buildings (California Code of Regulations, Title 24, Part 6).

MONDAY, OCTOBER 22, 2001
10 a.m.
CALIFORNIA ENERGY COMMISSION
1516 Ninth Street
Hearing Room A
Sacramento, California
(Hearing will be webcast; go to www.energy.ca.gov/realaudio/ - - Wheelchair Accessible)

Purpose of the Workshop

The next update to the Standards is expected to be adopted by the Commission by July 1, 2003, and go into effect in 2005. This "scoping workshop" kicks off the project to develop the 2005 Standards. We are seeking public comment on the scope, schedule, and plans for the project and on the specific topics to be addressed in those Standards.

Staff will present the proposed Key Topic Areas and Tasks of the project, the plans and schedule for the project, and a template for the information that will be expected when the public makes proposals for amendments to the standards. Workshop participants will have an opportunity to ask questions about this information and make comments. Also, participants will have an opportunity to briefly identify proposals for any Standards amendments that they expect to develop during the course of the project.

Participants who wish to make proposals for Standards amendments are requested to email short write-ups of these proposals to balcorn@energy.state.ca.us by October 15, 2001. The write-ups should include a short statement of the problem or opportunity and the proposed Standards change.

Background

Following the adoption of the 1998 Standards, the Commission decided to initiate a comprehensive review of the Building Energy Efficiency Standards and consider a variety of changes that would:

- make them more sensitive to the time dependence of energy use;
- increase the quality of construction and reliability of energy savings;
- address new opportunities to include emerging technologies and research conclusions from the Commission's Public Interest Energy Research (PIER) Program; and
- assess the economic implications of Standards provisions resulting from the restructuring of the electricity industry in California.

The Commission originally decided, because of the large scope of these changes, to skip the *California Building Code* update going into effect in 2002, and focus on more substantive changes to go into effect in 2005. However, this plan was interrupted by the passage of AB 970 (Statutes of 2000), which required the Commission to adopt an emergency update of the Standards to respond to California's electricity crisis.

The AB 970 Standards were developed in a very focused effort aimed at reducing peak electricity consumption, and incorporating energy efficiency measures for which there already was substantial information, Standards specifications could be developed quickly, and industry incorporation on an emergency basis without disruption could be accomplished.

This expedited process did not allow time for addressing measures that would primarily impact heating and water heating energy savings, many of the issue areas that the Commission had anticipated for the 2005 Standards, or many constructive ideas for Standards changes, which stakeholders proposed in the AB 970 emergency proceeding. Upon adoption of the AB 970 Standards, the Commission directed continued work on these topics for the 2005 Standards.

The Commission views continued efforts on the 2005 Standards as being directly related to the AB 970 mandate to "… on the earliest feasible date … adopt and implement updated and cost-effective standards … to ensure the maximum feasible reductions in wasteful, uneconomic, inefficient, or unnecessary consumption of electricity."

The Commission has targeted July 1, 2003, for adoption of these updated Standards. They are planned to go into effect in conjunction with the *California Building Code*, expected to be effective in 2005. Between the 2003 adoption date and the 2005 effective date, the Commission anticipates that the California utilities can focus Public Goods Charge-funded New Construction programs on providing a transition process for early, voluntary compliance with the upgraded Standards.

As the first step of the 2005 Standards project, the Commission plans to identify energy and peak load savings opportunities (measures) for both residential and nonresidential buildings, considering the following measures and criteria:

- Energy and demand savings potential
- More energy efficient levels of the measures currently required in the Standards
- Impact the measure will have on the project schedule and the evaluation of other measures
- Measures that are options for compliance in the performance standards but not required
- New measures that may be developed or may be proposed by a stakeholder or the Contractor
- Ability of building department inspectors or HERS raters acting as special inspectors to verify the measure in the field
- Reliability of the measure and its expected life
- Likely cost effectiveness of the measure
- Options for implementing the measure
- Maturity of the measure

For each identified measure, the Commission will identify sources of information relating to the cost, the useful life, the extent of availability of the measure; the potential for expanding the availability of the measure; the potential for environmental consequences either positive or negative associated with the measure; analysis of the energy consequences of the measure; and steps needed to obtain and document the information (including review of technical research and literature, existing testing procedures and standards, and consultation with Standards stakeholders and industry experts knowledgeable about the measure). The Commission will also document other information concerning the non-energy implications of the measure that may enhance or detract from the acceptance of the measure, such as health and safety implications, impacts on perceived comfort and productivity, and potential to enhance property valuation.

The Commission has developed the attached list of Key Topic Areas to be addressed in the 2005 Standards project.

The Commission also will address proposals from private and public organizations for possible Standards amendments for the 2005 Standards. Substantial work is underway by the California utilities to develop potential 2005 Standards amendments. The Commission intends to fully consider these as well as other proposals from the public. Proposers should expect to need to develop the same type and extent of information as that developed by the Commission (as summarized above). It will be critical that information for proposed amendments be developed in a timely way that meshes well with the Commission's schedule for development, public review, and adoption of the 2005 Standards.

Assistance

For information on participating in Commission proceedings, please contact Roberta Mendonca, the Public Adviser, (916) 654-4489, toll free (800) 822-6228, or by e-mail at <**pao@energy.state.ca.us**>. If you require special accommodations, please call (916) 654-5004 at least five days prior to the workshop. Technical questions should be directed to Bryan Alcorn, 2005 Standards Contract Manager, (916) 654-4222 or by e-mail at <**balcorn@energy.state.ca.us**>. News media inquiries should be directed to Assistant Executive Director Claudia Chandler, (916) 654-4989.

Mailed to lists: 50, 52, 53 and 480 Date: September 21, 2001

SUMMARY OF KEY TOPIC AREAS

1. Time Dependent Valuation

This topic area will consider changes to the way tradeoffs are made through performance standards compliance by valuing energy use by time-of-use and season. A measure that saves energy during the summer peak period would be weighted more than a measure that saved the same amount of energy during an off-peak period. Time dependent valuation also could change the way that requirements are set in areas of the state where natural gas is not available.

2. Nonresidential Performance Verification

Research shows that many building systems and controls do not work correctly without performance verification or "commissioning." Also, research has been done related to the extensive duct leakage in commercial buildings and the development of protocols to measure that leakage in the field and methods to improve the quantification of the energy impacts of that leakage. This topic area will consider adding performance verification requirements to selected nonresidential measures that have been shown to have "commissioning" problems to assure that their benefits are fully realized. It will also consider ways to improve the methods used for assigning credits for duct sealing in commercial buildings, which were introduced into the AB 970 Standards, and the potential for expanding the use of those credits.

3. Residential Construction Quality

Opportunities exist to improve the construction quality of residential building envelopes by paying more attention to the way insulation, framing and the building's air barrier are installed. Also, opportunities exist to improve the current protocols in the Standards that are used for field verification, including use of the "Delta Q" test for duct sealing and powered flowhoods, and/or the "Flow Grid" for airflow measurement. This topic area will consider modifying the default assumption for framing percentage, requiring building envelope installation improvements, and providing credits for improved installation with third party field verification.

4. Residential Glazing Area

This topic area will consider making residential glazing area neutral in performance standards calculations, up to a maximum glazing area of 20 to 24% (perhaps depending on climate). This would prevent omission of cost effective measures for buildings with small window area (both single family and multi-family), and it would make the prescriptive standards more widely applicable. The potential exists for establishing a "buildable package" for each climate zone by combining this approach with water heating (and perhaps HVAC) efficiencies that are readily available in the market.

5. Multi-Family Buildings

The standards are not nearly as effective as they should be for multi-family buildings because of excessive "credits" for central water heating systems and reduced glazing area that allow cost effective measures to be omitted. This topic area will consider ways to "close loopholes" for multi-family housing.

6. Residential Water Heating

Equipment used in California is typically more efficient than minimum federal appliance standards requirements, enabling other cost effective measures such as window performance to be degraded through performance standards calculations. This topic area will evaluate options to close the loophole, such as requiring heat traps and water heater blankets as part of the standard design or establishing "buildable packages" for each climate zone based on readily available equipment efficiencies.

7. Computer Modeling

CALRES and MICROPAS have some known problems that need to be corrected, including the lack of an hourly HVAC equipment model and needed improvements for slab edge gains and losses, assumptions for night ventilation, and water heating calculations. EnergyPlus is being developed by DOE and could be used in the future as a compliance program engine, particularly for nonresidential buildings. This topic area will consider computer modeling changes and the possibility of facilitating the future use of EnergyPlus as a compliance program engine for nonresidential buildings.

8. High EER Ratings, Proper Refrigerant Charge, Actual Fan Energy

The AB 970 Standards established methods to account for field research findings that actual residential air conditioning energy use is substantially greater than expected by laboratory test methods, and added requirements for field verified refrigerant charge and airflow measurement or thermostatic expansions valves for split system air conditioners. Also, a new methodology was adopted for accounting for the fact that SEER ratings fail to provide reliable on peak energy savings. This topic area will examine the applicability of refrigerant charge and airflow measurement to package equipment, consider credits for reduction in actual fan energy, establish credits for high EER equipment, and investigate whether the temperature split method is a sufficiently adequate airflow test protocol for continued use in the Standards.

9. Residential Air Conditioner Sizing

The residential standards do not currently impose limits on the size of air conditioners that can be installed, even though the size has a major impact on peak demand for electricity. This topic area will consider ways to limit air conditioning size, either by setting a "capacity budget" on the basis of floor area and climate or by requiring sizing to load calculations.

10. Lighting Improvements

Opportunities exist to save lighting energy in nonresidential buildings either through revised lighting power densities or changes to lighting control requirements. Also, SB 5X granted new authority to the Commission for establishing Standards requirements for "exterior" lighting, both lighting in unconditioned building spaces and outdoor lighting. This topic area will consider revisions to current nonresidential lighting requirements and new requirements for exterior lighting.

The current kitchen and bathroom lighting requirements for residential buildings are perceived as not being effective in capturing the intended energy savings. Also, the current wide use of incandescent fixtures, in particular recessed light fixtures, represents a major opportunity for energy efficiency improvements. This topic area will consider approaches to improve the efficiency of residential lighting.

11. Replacement Windows and Other Residential Alterations

Considerable savings can be achieved by requiring replacement windows and other alterations to meet efficiency requirements. In addition to efficient window replacements, opportunities exist to cost effectively save energy at the time that HVAC equipment, ducts, or roofs are altered. This topic area will consider requirements for improvements in conjunction with residential alterations, including replacement windows and other HVAC, duct and envelope alterations.

12. Ducts in Conditioned Space for Residential Buildings
The current practice of locating HVAC air ducts in unconditioned attics causes unnecessarily high energy use and peak demand. Currently, a major credit is available for locating the ducts in conditioned space, but builders are not changing typical practice to take advantage of this credit. This topic area will develop information for inclusion in the residential manual and for builder training to clearly present the methods that are available and the advantages of locating the ducts in conditioned space.

13. Residential and Nonresidential Controls to Facilitate Voluntary Load Shedding
This topic area will consider requiring wiring or controls that would facilitate the installation of real time meters for HVAC equipment in residential and nonresidential buildings and lighting in nonresidential buildings. This would enable homes and businesses to potentially dramatically reduce demand during peak periods.

14. Selected Measures from National Consensus Standards
This topic area will consider incorporation in Title 24 of selected requirements from national consensus standards (ASHRAE/IES 90.1 and the IECC) that would help keep California requirements more energy conserving than the national standards. The federal Energy Policy Act requires states to adopt nonresidential standards that are at least as stringent as ASHRAE/IESNA Standard 90.1 and to use the IECC as a benchmark for comparison for residential standards.

15. Nonresidential T-Bar Ceilings
The current nonresidential standards allow insulation to be installed on a suspended ceiling and to be considered the thermal and air barrier. However, research shows that this insulation is discontinuous and air leakage through the t-bar ceiling is high. This configuration also has a substantial impact on duct efficiency. This topic area will consider possible restrictions on this practice.

16. Reconsideration of Climate Zone Boundaries
Climate zone 7 near San Diego, which represents the very mild, marine climate along the coast, may extend too far inland. The southern boundary of climate zone 4 (south of San Jose), which represents the mild, Bay area climate, may extend too far south. The result of misplaced boundaries in these areas is that substantial construction is occurring with Standards requirements that may be too lenient for the actual climate that exists. This topic area will evaluate these climate zone boundaries through review of weather data and data on installation of air conditioners in these areas.

17. Demand Control Ventilation
ASHRAE Standard 62 has provisions for demand control ventilation that may be more practical and energy conserving than those in Title 24. Also, Standard 62 may have ventilation requirements that are more appropriate than those now in Title 24. This topic area will consider improvement of the demand control ventilation requirements, extension of the requirement for demand control ventilation to more nonresidential buildings.

18. Treatment of Photovoltaics
The Standards currently provide no credits for site-installed photovoltaics. The standards allow for a credit, but the ACM Approval Manual does not have procedures for accounting for them. This topic area will consider providing a way for photovoltaics to be credited in the compliance process.